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Boezeman et al.

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[45] **Date of Patent: *Aug. 22, 2000**

[54] **METHOD AND SYSTEM FOR A TRUE-SCALE MOTION PATH EDITOR**

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[73] Assignee: **International Business Machines Corp.**, Armonk, N.Y.

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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[51] **Int. Cl.**[7] **G06T 13/00**

[52] **U.S. Cl.** **345/438**; 345/474

[58] **Field of Search** 345/433, 438, 345/473–475

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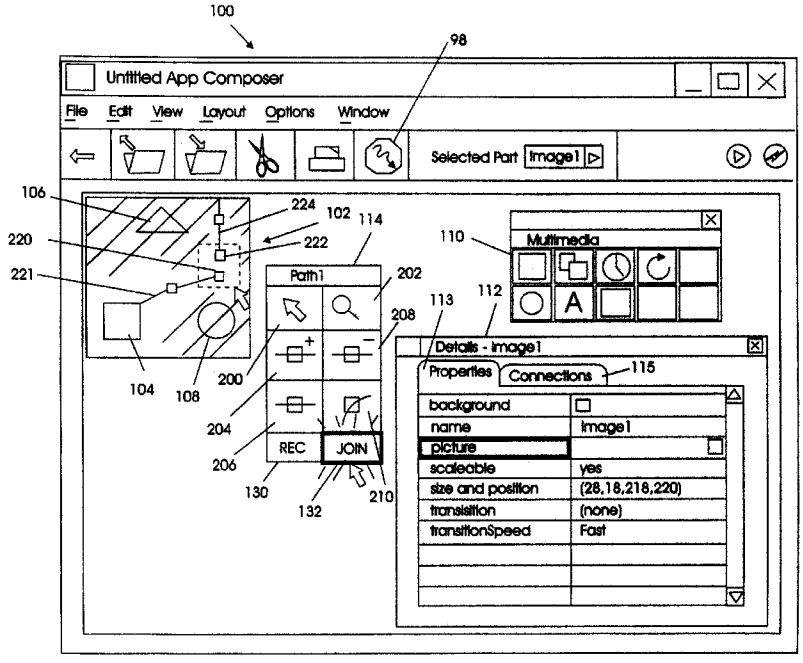
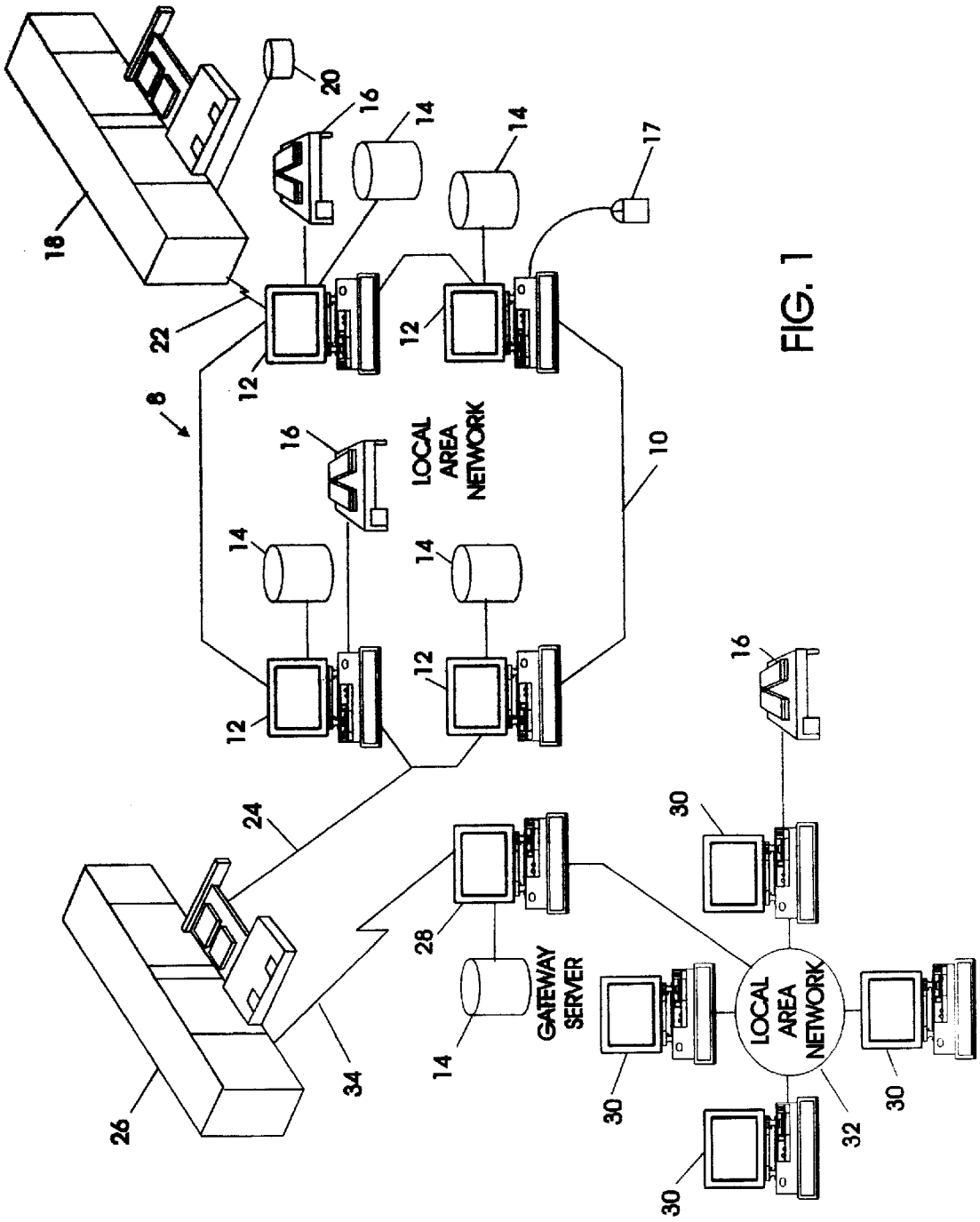
[57] **ABSTRACT**

A movement path is defined for a multimedia object in an application development environment. A multimedia object is placed in a layout area of the application development environment. A movement path is then specified within the layout area for the object using a pointing device. The object may either be dragged along the movement path by the pointing device or individual points may be selected with the pointing device to define the movement path. Once the path has been defined, the path may be easily modified. The user may add or delete points by simply selecting a point with the pointing device for addition or deletion. In addition, the user may combine two or more movement paths into one.

15 Claims, 9 Drawing Sheets




LOCAL AREA NETWORK
GATEWAY SERVER
LOCAL AREA NETWORK
8
10
12
14
16
17
18
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22
24
26
28
30
32
34

FIG. 1

FIG. 2

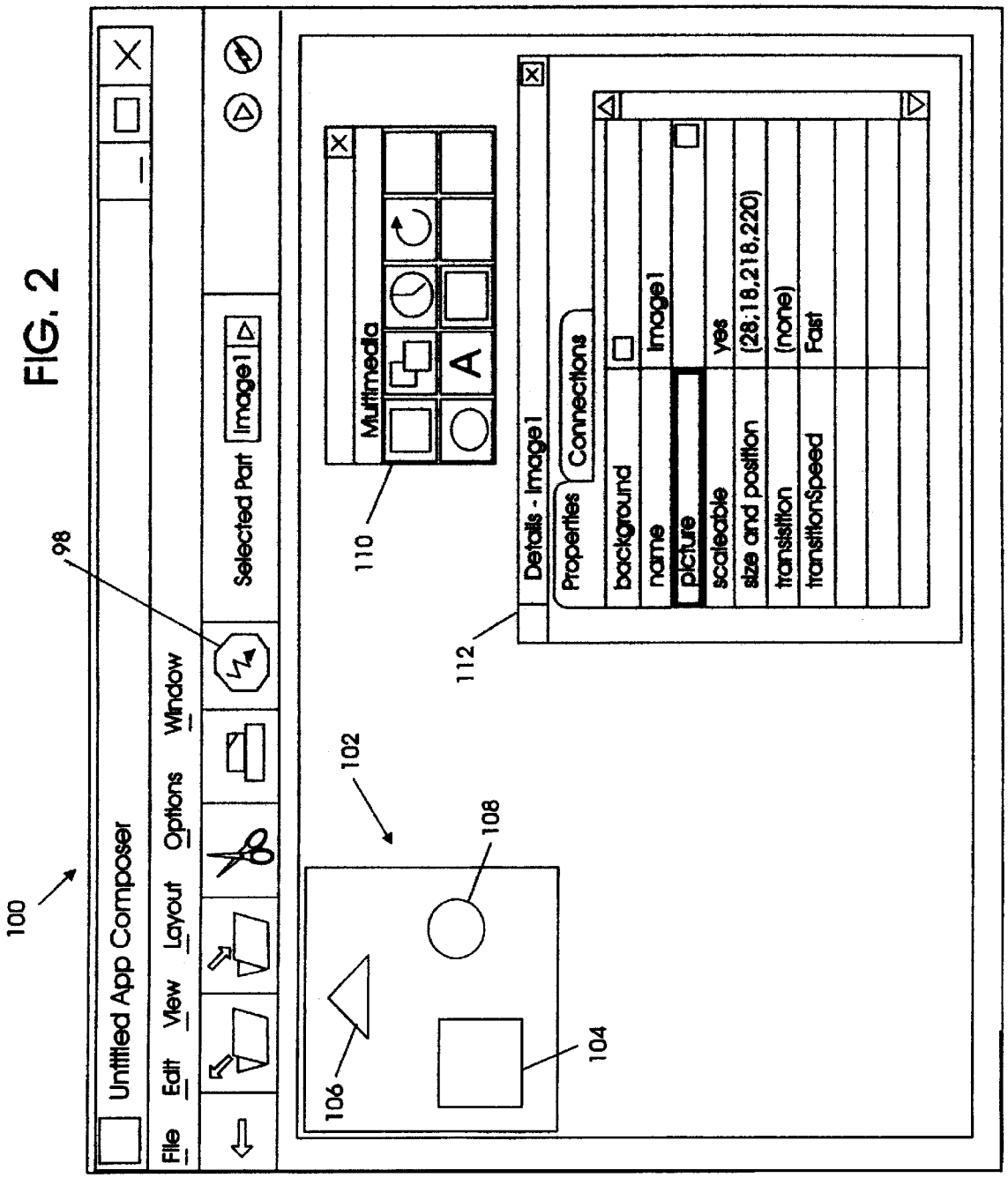
100
98
Untitled App Composer
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Image1
Multimedia
110
Details - Image1
Properties
Connections
background
name
picture
scaleable
size and position
transition
transitionSpeed
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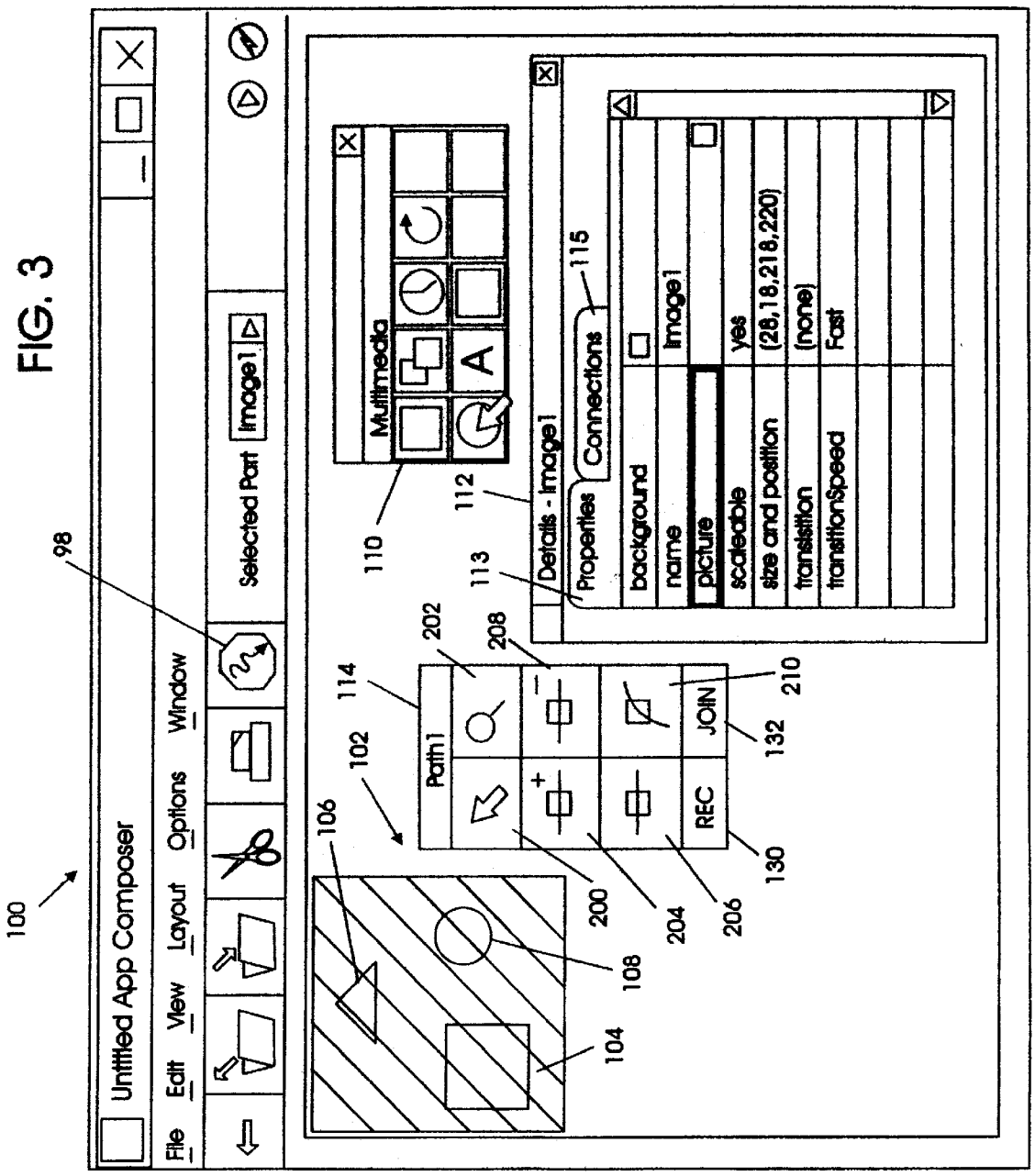
(none)
Fast
112
102
108
106
104

FIG. 3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Untitled App Composer
File Edit View Layout Options Window
98
Selected Part
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Multimedia
110
112
Details - Image1
Properties
Connections
115
113
background
name
picture
scalable
size and position
transition
transitionSpeed
Image1
yes
(28,18,218,220)
(none)
Fast
202
208
114
Path1
102
106
200
204
206
JOIN
REC
210
132
130
108
104

FIG. 4

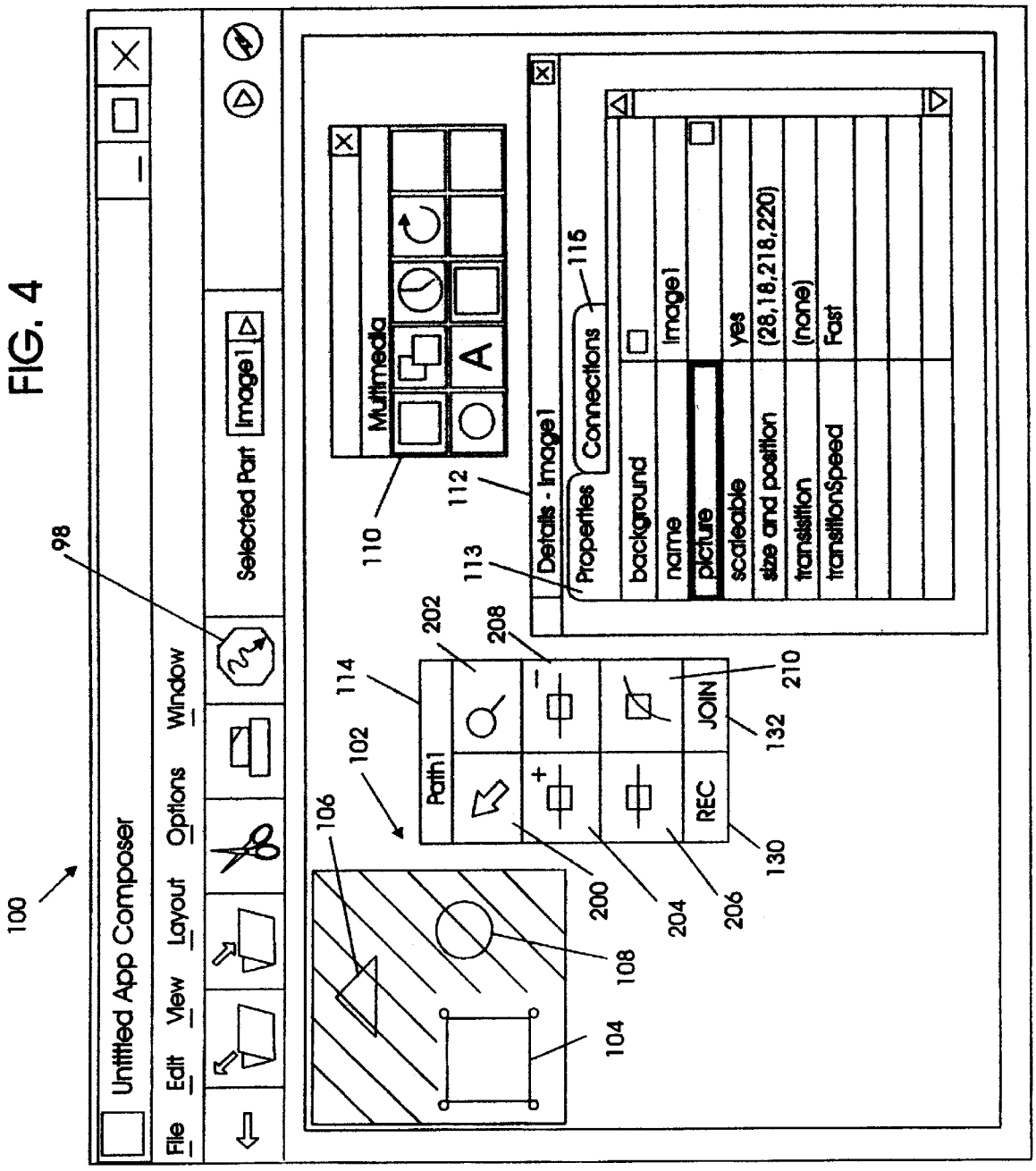
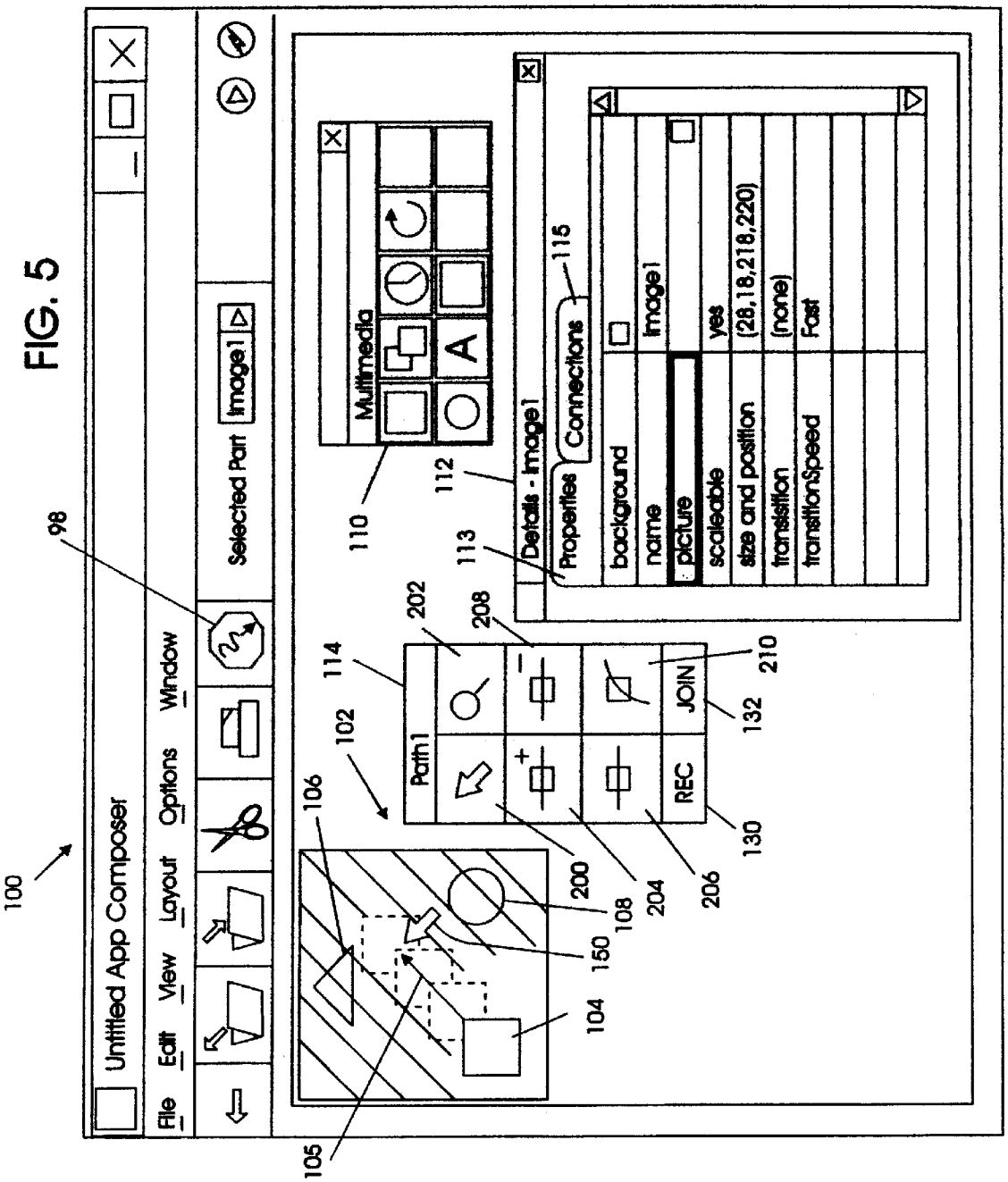

100
98
Untitled App Composer
File Edit View Layout Options Window
Selected Part
Image1
Multimedia
110
112
Details - Image1
Properties
Connections
115
113
background
name
picture
scaleable
size and position
transition
transitionSpeed
Image1
yes
(28,18,218,220)
(none)
Fast
114
202
208
210
Path1
JOIN
REC
132
130
102
106
200
204
206
108
104

FIG. 5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Multimedia
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112
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Properties
Connections
115
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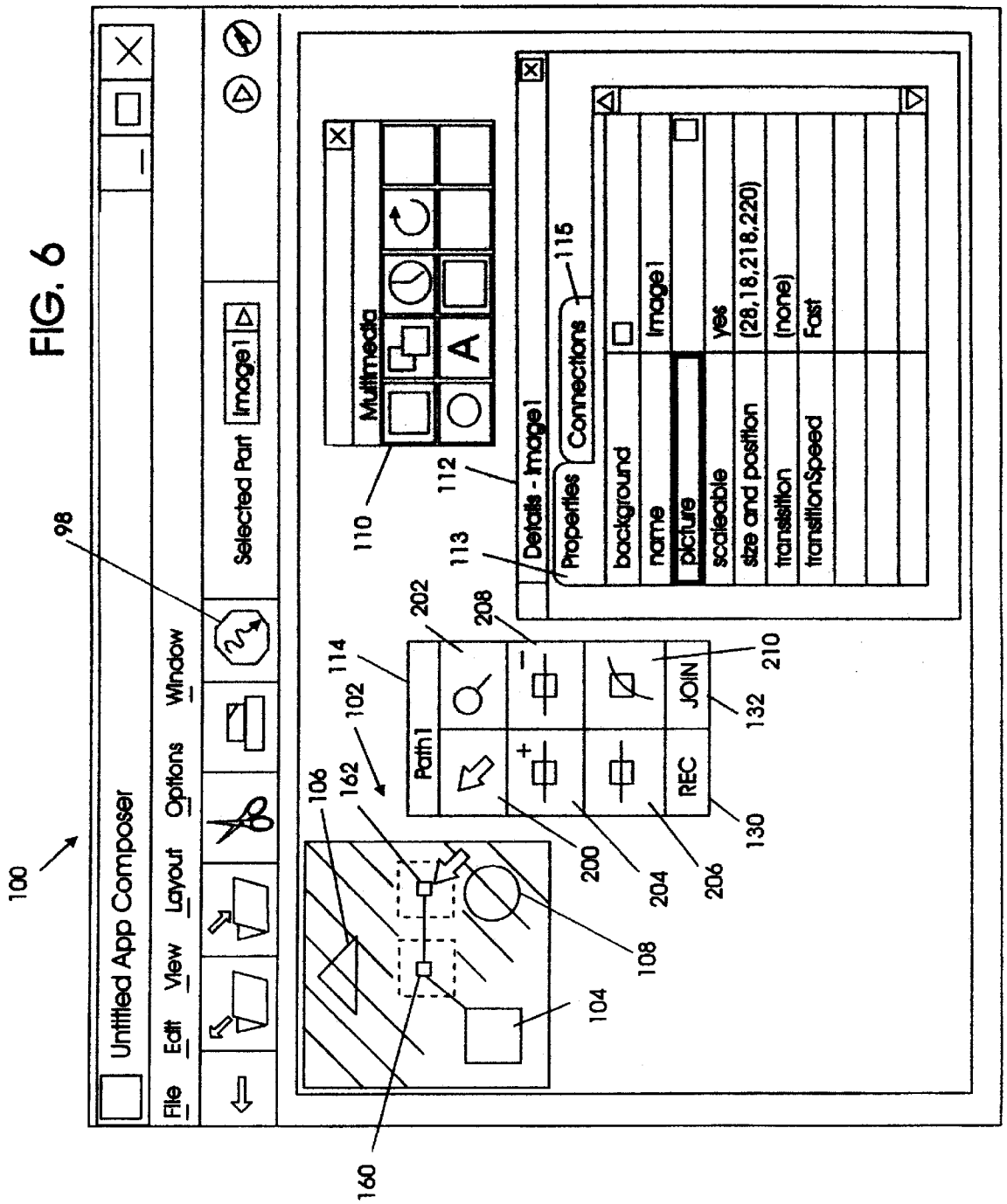
background
name
picture
scaleable
size and position
transition
transitionSpeed
Image1
yes
(28,18,218,220)
(none)
Fast
202
208
114
Path1
102
JOIN
REC
210
132
130
106
200
204
206
108
150
104
105

FIG. 6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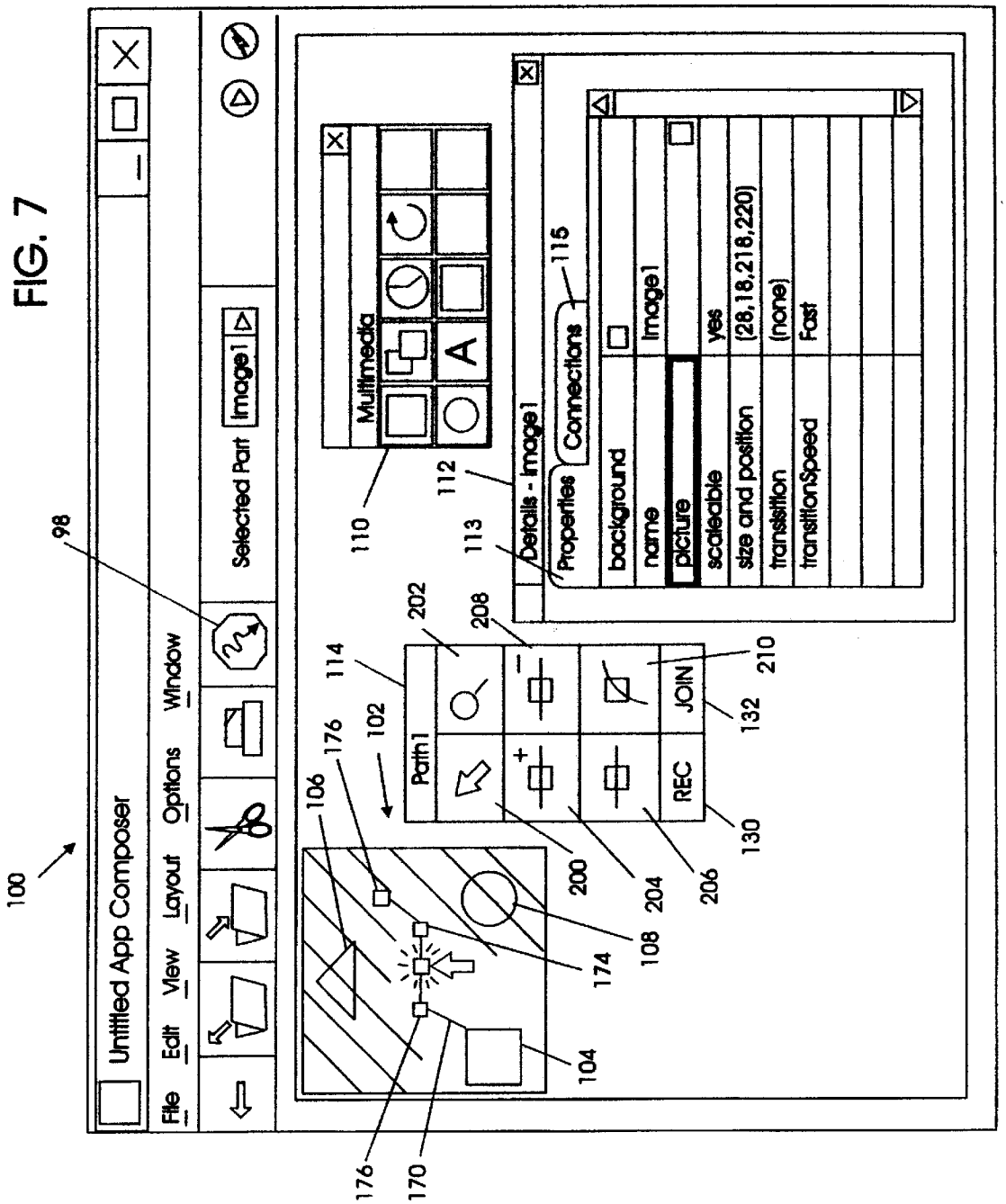
File Edit View Layout Options Window
Selected Part
image1
98
Multimedia
110
112
Details - image1
Properties
Connections
115
background
name
picture
scaleable
size and position
translation
transitionSpeed
image1
yes
(28,18,218,220)
(none)
Fast
113
202
208
114
102
Path1
JOIN
REC
210
132
130
106
162
200
204
206
108
104
160

FIG. 7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Selected Part
Image1
Multimedia
Details - Image1
Properties
Connections
background
name
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scaleable
size and position
transition
transitionSpeed
Image1
yes
(28,18,216,220)
(none)
Fast
Path1
REC
JOIN
100
98
102
104
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108
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115
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174
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200
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204
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208
210

FIG. 8

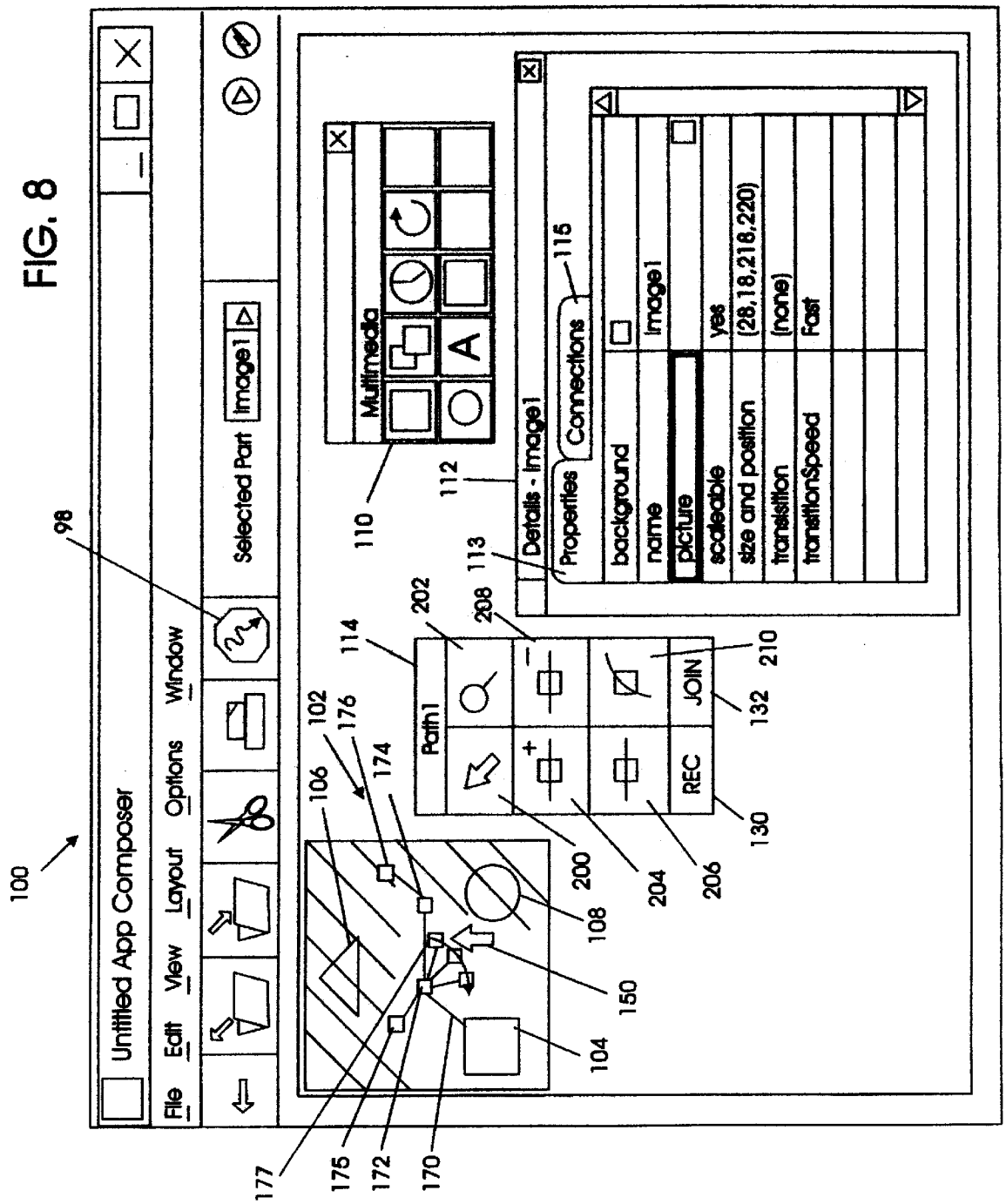
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Image1
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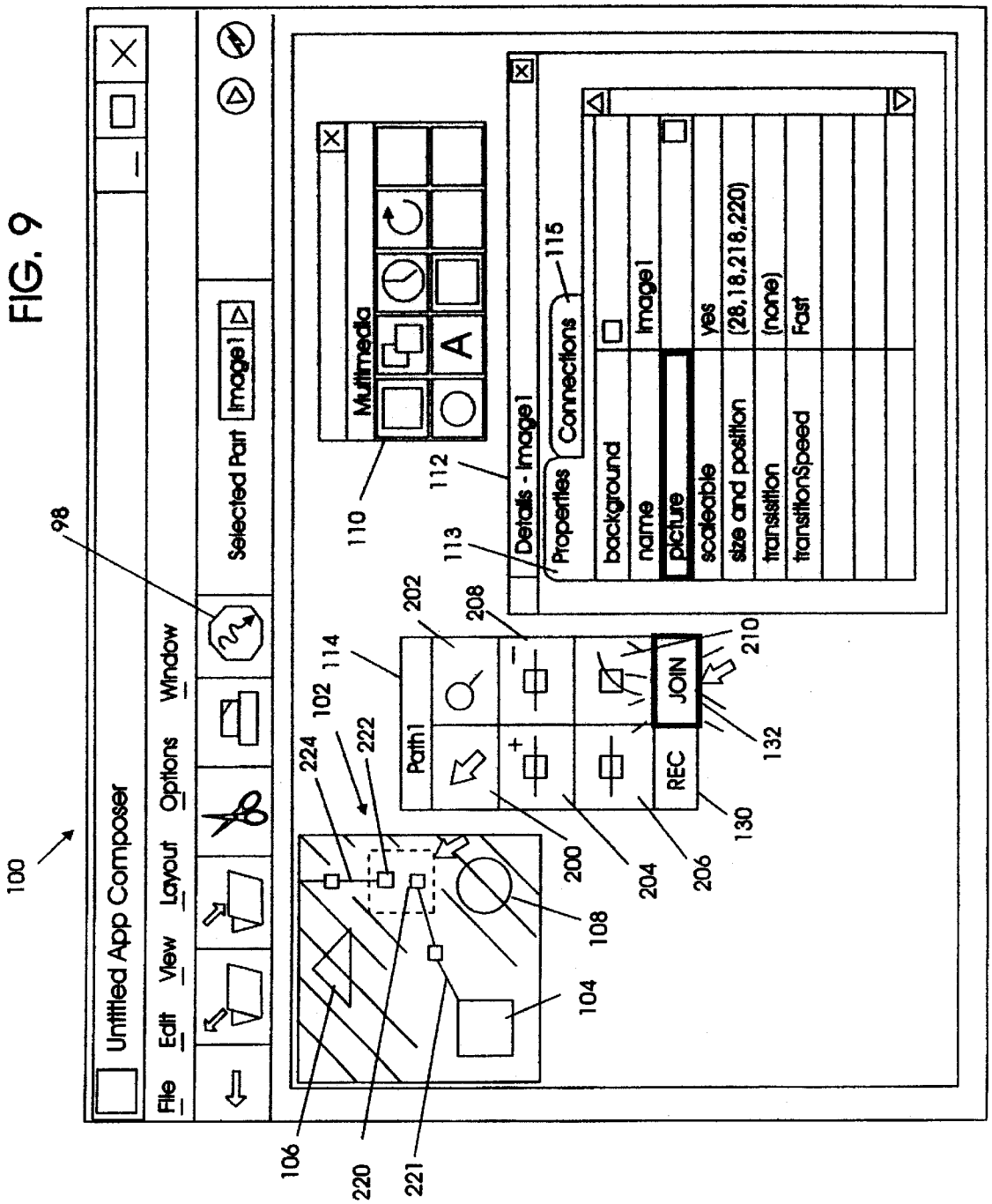
Multimedia
110
112
Details - Image1
Properties
Connections
116
113
background
name
picture
scaleable
size and position
transition
transitionSpeed
Image1
yes
(28,18,218,220)
(none)
Fast
202
208
114
Path1
JOIN
REC
210
132
130
102
176
174
106
200
204
206
108
150
104
177
175
172
170

FIG. 9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size and position
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transitionSpeed
Image1
yes
(28,18,218,220)
(none)
Fast
Path1
JOIN
REC
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221
222
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132

METHOD AND SYSTEM FOR A TRUE-SCALE MOTION PATH EDITOR

CROSS REFERENCE TO RELATED APPLICATIONS

This Application is related in subject matter to the following Applications filed concurrently herewith and assigned to a common Assignee:

Application Ser. No. 08/896,817 filed by Boezeman, et al., entitled "Method and System for a True-Scale Motion Path Editor to Create Motion Paths as Independent Entities"; application Ser. No. 80/896,648 filed by Boezeman, et al., entitled "Method and System for a True-Scale Motion Path Editor Using Time Segments, Duration and Synchronization"; and application Ser. No. 08/896,818 filed by Boezeman, et al., entitled "Method and System for a True-Scale Motion Path Editor Using Proximity Detection/Reaction and Event Generation".

The foregoing applications are incorporated herein by reference.

FIELD OF THE INVENTION

This invention relates in general to computer software, and in particular to a method and system for defining the movement path of a multimedia object in an application development environment.

BACKGROUND OF THE INVENTION

In a multimedia application development environment, users often want to assign a path along which the part will move to give the application special effects. For example, a user might want to display an animation of a bird appearing on the left edge of a page and flying across the page to exit on the right side of the page. Using the known techniques, the assignment of a motion path to a part is tedious. In addition, the known techniques have limited flexibility and require construction separate from the part layout area. Once constructed, it is difficult to modify the path.

One type of path definition is found in, for example, Premier by Adobe. To construct a path for an object/part, the user must exit the layout area and enter a separate window. Then, the user can draw a path for the part using a pointing device. There is no one-to-one scale and the path is drawn without the perspective of the actual environment including lack of true-scale surrounding parts. Thus, the user must create the path and then assign it, return to the layout area and run a test. If the path does not work as expected, the user must return to the separate path definition window and try again. This is awkward and time consuming, especially in complex layouts.

Another type of path definition can be found in Director by Macromedia. This type of path definition allows the use of the actual layout area for construction but also requires the use of a "score" area. The user must drag the part to the start time in the score. Then the user must drag the part to the next movement position in the layout are followed by another dragging to the score area for the time it should appear in that position. Once these steps have occurred from start point to finish point, the score area is highlighted and the placement is made on the layout area. Thus, this method can also be slow and tedious.

Thus, there is a need for a method and system for path definition that is quick and easy to use, especially for complex arrangements of multiple parts of any type using multiple paths.

SUMMARY OF THE INVENTION

The present invention disclosed herein comprises a method and system for defining a movement path of a multimedia object which greatly reduces problems associated with the prior art. The present invention allows the creation and modification of a movement path without the need for a separate path dialog.

In accordance with one aspect of the present invention, a movement path is defined for a multimedia object in an application development environment. A multimedia object is placed in a layout area of the application development environment. A movement path is then specified within the layout area for the object using a pointing device. The object may either be dragged along the movement path by the pointing device or individual points may be selected with the pointing device to define the movement path.

Once the path has been defined, the path may be easily modified. The user may add or delete points by simply selecting a point with the pointing device for addition or deletion. In addition, the user may combine two or more movement paths into one.

The present invention provides the technical advantage of being able to simply and intuitively create and modify a movement path for a multimedia object in an application development environment. Previously created and stored paths may be reused and or added to newly created paths, thus, providing greater flexibility for the developer.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and for further advantages thereof, reference is now made to the following Detailed Description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a pictorial representation of a data processing system which may be utilized to implement a method and system of the present invention;

FIG. **2** is a graphical representation of a multimedia parts editor;

FIGS. **3**,**4** and **5** are graphical representations of the multimedia editor of FIG. **1** utilizing a path editor in accordance with the present invention;

FIG. **6** illustrates use of the present invention to define a path utilizing various anchor points;

FIG. **7** illustrates the use of the present invention to add or delete an anchor point to a path;

FIG. **8** illustrates use of the present invention to define a curved path; and

FIG. **9** illustrates the use of the present invention to join a predefined and stored path to a newly created path.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. **1**, there is depicted a graphical representation of a data processing system **8**, which may utilized to implement the present invention. As may be seen, data processing system **8** may include a plurality of networks, such as Local Area Networks (LAN) **10** and **32**, each of which preferably includes a plurality of individual computers **12** and **30**, respectively. Of course, those skilled in the art will appreciate that a plurality of Intelligent Work Stations (IWS) coupled to a host processor may be utilized for each such network. As is common in such data processing systems, each individual computer may be coupled to a storage device **14** and/or a printer/output device **16** and may be provided with a pointing device such as a mouse **17**.

The data processing system **8** may also include multiple mainframe computers, such as mainframe computer **18**, which may be preferably coupled to LAN **10** by means of communications link **22**. The mainframe computer **18** may also be coupled to a storage device **20** which may serve as remote storage for LAN **10**. Similarly, LAN **10** may be coupled via communications link **24** through a sub-system control unit/communications controller **26** and communications link **34** to a gateway server **28**. The gateway server **28** is preferably an IWS which serves to link LAN **32** to LAN **10**.

With respect to LAN **32** and LAN **10**, a plurality of documents or resource objects maybe stored within storage device **20** and controlled by mainframe computer **18**, as resource manager or library service for the resource objects thus stored. Of course, those skilled in the art will appreciate that mainframe computer **18** may be located a great geographic distance from LAN **10** and similarly, LAN **10** may be located a substantial distance from LAN **32**. For example, LAN **32** may be located in California while LAN **10** may be located within North Carolina and mainframe computer **18** may be located in New York.

Software program code which employs the present invention is typically stored in the memory of a storage device **14** of a stand alone workstation or LAN server from which a developer may access the code for distribution purposes, the software program code may be embodied on any of a variety of known media for use with a data processing system such as a diskette or CD-ROM or may be distributed to users from a memory of one computer system over a network of some type to other computer systems for use by users of such other systems. Such techniques and methods for embodying software code on media and/or distributing software code are well-known and will not be further discussed herein.

Referring to FIG. **2**, a graphical representation of a multimedia part editor is shown in window **100**. Within the part editor **100** there appears a layout area, generally indicated by reference numeral **102**, in which a plurality of multimedia objects/parts, for example, square **104**, triangle **106** and circle **108**, are positioned for manipulation. A palette window **110** and a Details window **112** are also provided. The palette window **110** contains a collection of parts available for use in the current application being developed. These may include multimedia parts(image, sound, animation, etc) and/or controls (buttons, labels, listboxes, etc).

The Details window **112** is used to modify and customize the specific parts used in the current application and add logic between parts. A Properties tab **113** in the Details window **112** provides a method to modify the parts by allowing the user to customize specific characteristics of parts in the current application. For example, the picture property of an image part can be any source file (in the correct format) that the user desires. A Connections tab **115** of the Details window **112** provides a method to add logic between parts in the "part, event—part, action/property" format. For example, a user can add logic between a button and a sound file so that when the button is clicked, the sound file will play. This connection would read: "button clicked-sound play".

Referring to FIG. **3**, upon pressing a motion path button **98** on a main toolbar or by selecting "Motion Path Editor" (not shown) via an appropriate menu choice, a path editor window **114** appears adjacent to the layout area **102**. A part specific path can also be created by first selecting a part to apply the path to and then pressing the motion path button **98** on the main toolbar or by selecting "Motion Path Editor" via the appropriate menu choice. The path window **114** is provided with a plurality of buttons and tools (which will be subsequently described in greater detail), including a "Record" push-button **130** and a "Join" push-button **132**. In addition, all the parts/images within the layout area **102** are slightly ghosted when the motion path window **114** is first displayed, as indicated by the diagonal lines appearing therethrough.

Referring to FIG. **4**, the user has selected an object, for example, the square **104**, to which a path will be assigned. As shown in FIG. **4**, the square **104** has become unghosted (shown without diagonal lines). There are two methods for creating the motion path for square **104**. First, the user can press the record push-button **130**, and while holding the mouse button down, drag the square **104** manually in the layout area **102** to define a path. In the second method, the user can manually define individual points along which the square **104** will follow for its path.

Referring to FIG. **5**, an example of the manual drag technique to assign a path is shown. The user presses the Record push-button **130**, and then places a cursor **150** over the object to be moved, for example, the square **104**, and drags the object along a path (shown as line **105**) of the desired movement. When the user has reached the point at which he/she would like the path to end, the user releases the mouse button and the path "record" activity ceases. When set into motion, the square **104** will then move along the path **105** as drawn.

Referring to FIG. **6**, the setting of anchor points technique is shown. The user can define as many anchor points as desired, for example, anchor point **160** and anchor point **162** with the initial anchor point defined as the physical center (not shown) of the object. A connecting line is automatically drawn between anchor points as each subsequent anchor point is defined. To indicate the end of the path, the user double-clicks the mouse at the location of the end point, this action completes the path. When set in motion, the object (square **104**) will then move along the path as defined by the anchor points.

Referring to FIG. **7**, having already defined a motion path as identified by line **170** from the square **104** through anchor points **172**, **174** and **176**, the user decides that the path **170** needs to be modified. To add a point on the path **170**, the user selects an anchor point "Add" tool **204** from the path editor window **114** and moves the cursor **150** over the desired location for a new anchor point **171** and presses the mouse button. This adds the new anchor point **171** on the path **170**. To delete an existing point from the path **170**, the user selects the anchor point "Delete" tool **208** from the path editor window **114**, moves the cursor **150** over the existing point to be deleted and presses the mouse button. This deletes the indicated anchor point from the path **170**.

Referring to FIG. **8**, a technique for curving a path is illustrated. The user defines a curve by simply holding and dragging the mouse as the anchor point is being laid, producing an anchor point with two handles **175** and **177** which the user can define and smooth the curve (as shown, handle **177** is dragged "clockwise"). Alternatively, the user can select the anchor point and press an anchor point "curve point" tool **210** in the path editor window **114**. Similarly, to make a curve point anchor point into a straight line anchor point, the user can select the curve point anchor point on the layout area **102** and press an anchor point "straight line" tool **206** on the path editor window **114**.

Referring to FIG. **9**, a technique is illustrated for joining two or more movement paths . Any two or more paths can

be joined by selecting an end anchor point, for example, anchor point **220**, of a first path **221** to be joined and an end anchor point **222** of a second path **224** and pressing the "Join" button **132** on the path editor window **114**. A position of the two points is averaged in both a horizontal and a vertical direction and one point is created from the two at the resulting position. The user can also select the two anchor points (points **220** and **222**) to be joined by clicking the mouse and dragging a dynamically sized box around the two points and pressing the "Join" button **132** on the path editor window **114**.

Thus the present invention offers strong advantages over traditional motion path editors. As described herein, the present invention allows the definition of a true-scale path without requiring the use of a separate path editor dialog. Also provided herein are easy to use methods for path (including curved paths) construction, modification, and joining.

Although the present invention has been described with respect to a specific preferred embodiment thereof, various changes and modifications may be suggested to one skilled in the art and it is intended that the present invention encompass such changes and modifications as fall within the scope of the appended claims.

What is claimed is:

1. A method of defining a movement path of a multimedia object in an application development environment, comprising the steps of:

placing a multimedia object in a layout area of the application development environment;

graphically specifying a plurality of movement paths within said layout area for said object with a pointing device without the need to enter a separate layout editor in an area separate from said layout area;

displaying the specified plurality of movement paths in the layout area; and

graphically revising the specified plurality of movement paths displayed in the layout area by joining at least two of the plurality of movement paths to provide a single movement path for the object; wherein the step of joining comprises averaging the positions of two corresponding points on the at least two paths so as to provide a third point which joins the at least two paths.

2. The method of claim **1**, wherein said step of specifying further comprises:

dragging said object along said movement path with said pointing device.

3. The method of claim **1**, wherein said step of specifying further comprises:

selecting individual points with said pointing device which will define said movement path.

4. The method of claim **3**, further comprising the step of:

adding additional points to said path after said path has been defined.

5. The method of claim **3**, further comprising the step of:

deleting points from said path after said path has been defined.

6. A system for defining a movement path of a multimedia object in an application development environment, comprising:

means for placing a multimedia object in a layout area of the application development environment;

means for graphically specifying a plurality of movement paths within said layout area for said object with a pointing device without the need to enter a separate layout editor in an area separate from said layout area;

means for displaying the specified plurality of movement paths in the layout area; and

means for graphically revising the specified plurality of movement paths displayed in the layout area by joining at least two of the plurality of movement paths to provide a single movement path for the object, wherein the step of joining comprises averaging the positions of two corresponding points on the at least two paths so as to provide a third point which joins the at least two paths.

7. The system of claim **6**, wherein said means for specifying further comprises:

means for dragging said object along said movement path with said pointing device.

8. The system of claim **6**, wherein said means for specifying further comprises:

means for selecting individual points with said pointing device which will define said movement path.

9. The system of claim **8**, further comprising:

means for adding additional points to said path after said path has been defined.

10. The system of claim **8**, further comprising:

means for deleting points from said path after said path has been defined.

11. A computer program product recorded on a computer readable medium for defining a movement path of a multimedia object in an application development environment, comprising:

computer readable means for placing a multimedia object in a layout area of the application development environment;

computer readable means for graphically specifying a plurality of movement paths within said layout area for said object with a pointing device without the need to enter a separate layout editor in an area separate from said layout area;

computer readable means for displaying the specified plurality of movement paths in the layout area; and

computer readable means for graphically revising the specified plurality of movement paths displayed in the layout area by joining at least two of the plurality of movement paths to provide a single movement path for the object,

wherein the step of joining comprises averaging the positions of two corresponding points on the at least two paths so as to provide a third point which joins the at least two paths.

12. The program product of claim **11**, wherein said computer readable means for specifying further comprises:

computer readable means for dragging said object along said movement path with said pointing device.

13. The program product of claim **11**, wherein said computer readable means for specifying further comprises:

computer readable means for selecting individual points with said pointing device which will define said movement path.

14. The program product of claim **13**, further comprising:

computer readable means for adding additional points to said path after said path has been defined.

15. The program product of claim **13**, further comprising:

computer readable means for deleting points from said path after said path has been defined.

* * * * *